EXHIBIT 17

WEBSTER'S
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: something that completes: as **a :** the yarn interlacing the warp in a fabric; *also* **:** yarn for the shuttle **b :** a food mixture used to fill pastry or sandwiches

filling station *n* (1921) **:** SERVICE STATION 1

¹fil·lip \'fil-əp\ *vt* [prob. of imit. origin] (15c) **1 a :** to strike or tap with a fillip ⟨~*ed* him on the nose⟩ **b :** to make a filliping motion with ⟨~*ed* his fingers⟩ **2 :** to project quickly by or as if by a fillip ⟨~ crumbs off the table⟩ **3 :** STIMULATE ⟨with this to ~ his spirits —Robert Westerby⟩

²fillip *n* (ca. 1530) **1 a :** a blow or gesture made by the sudden forcible straightening of a finger curled up against the thumb **b :** a short sharp blow **:** BUFFET **2 :** something tending to arouse or excite

fill out *vi* (1888) **:** to put on flesh

fil·ly \'fil-ē\ *n, pl* **fillies** [ME *fyly*, fr. ON *fylja*; akin to OE *fola* foal] (15c) **1 :** a young female horse usu. of less than four years **2 :** a young woman **:** GIRL

¹film \'film\ *n, often attrib* [ME *filme*, fr. OE *filmen*; akin to Gk *pelma* sole of the foot, OE *fell* skin — more at FELL] (bef. 12c) **1 a :** a thin skin or membranous covering **:** PELLICLE **b :** an abnormal growth on or in the eye **2 :** a thin covering or coating ⟨a ~ of ice on the pond⟩ **3 a :** an exceedingly thin layer **:** LAMINA **b (1) :** a thin flexible transparent sheet (as of plastic) used as a wrapping **(2) :** such a sheet of cellulose acetate or cellulose nitrate coated with a radiation-sensitive emulsion for taking photographs or making roentgenograms **4 :** MOTION PICTURE

²film *vt* (1602) **1 :** to cover with or as if with a film **2 :** to make a motion picture of or from ⟨~ a scene⟩ ~ *vi* **1 :** to become covered or obscured with or as if with a film **2 :** to make a motion picture

film badge *n* (1945) **:** a small pack of sensitive photographic film worn as a badge for indicating exposure to radiation

film·card \'film-,kärd\ *n* (1965) **:** MICROFICHE

film·dom \'film-dəm\ *n* (1916) **:** the motion-picture industry

film·ic \'fil-mik\ *adj* (ca. 1930) **:** of, relating to, or resembling motion pictures — **film·i·cal·ly** \-mi-k(ə-)lē\ *adv*

film·mak·er \'film-,mā-kər\ *n* (1908) **:** MOVIEMAKER

film·mak·ing \-,mā-kiŋ\ *n* (1913) **:** the making of movies

film noir \-'nwär\ *n* [F, lit., black film] (1958) **:** a type of crime film featuring cynical malevolent characters in a sleazy setting and an ominous atmosphere that is conveyed by shadowy photography and foreboding background music; *also* **:** a film of this type

film·og·ra·phy \fil-'mäg-rə-fē\ *n, pl* **-phies** [*film* + *-ography* (as in *bibliography*)] (1962) **:** a list of motion pictures featuring the work of a prominent film figure or relating to a particular topic

film·set·ting \'film-,set-iŋ\ *n* (1961) **:** PHOTOCOMPOSITION — **film·set** *adj* — **filmset** *vt* — **film·set·ter** *n*

film·strip \'film-,strip\ *n* (1930) **:** a strip of usu. 35 millimeter film bearing photographs, diagrams, or graphic matter for still projection

filmy \'fil-mē\ *adj* **film·i·er; -est** (1604) **1 :** of, resembling, or composed of film **:** GAUZY ⟨~ draperies⟩ **2 :** covered with a haze or film — **film·i·ly** \-mə-lē\ *adv* — **film·i·ness** \-mē-nəs\ *n*

filo- — see FILI-

fils \'fils\ *n, pl* **fils** [Ar] (1931) — see *dinar, dirham, rial* at MONEY table

¹fil·ter \'fil-tər\ *n* [ME *filtre*, fr. ML *filtrum* piece of felt used as a filter, of Gmc origin; akin to OHG *filz* felt — more at FELT] (1563) **1 :** a porous article or mass (as of paper or sand) through which a gas or liquid is passed to separate out matter in suspension **2 :** an apparatus containing a filter medium **3 a :** a device or material for suppressing or minimizing waves or oscillations of certain frequencies (as of electricity, light, or sound) **b :** a transparent material (as colored glass) that absorbs light of certain wavelengths or colors selectively and is used for modifying light that reaches a sensitized photographic material — called also *color filter*

²filter *vb* **fil·tered; fil·ter·ing** \-t(ə-)riŋ\ *vt* (1576) **1 :** to subject to the action of a filter **2 :** to remove by means of a filter ~ *vi* **1 :** to pass or move through or as if through a filter **2 :** to come or go in small units over a period of time ⟨people began ~*ing* in⟩

fil·ter·able *also* **fil·tra·ble** \'fil-t(ə-)rə-bəl\ *adj* (1908) **:** capable of being filtered or of passing through a filter — **fil·ter·abil·i·ty** \,fil-t(ə-)rə-'bil-ət-ē\ *n*

filterable virus *n* (1911) **:** any of the infectious agents that remain virulent after a fluid containing them passes through a filter of diatomite or unglazed porcelain and that include the viruses as presently understood and various other groups (as the mycoplasmas and rickettsias) which were orig. considered viruses before their cellular nature was established

filter bed *n* (ca. 1874) **:** a sand or gravel bed for filtering water or sewage

filter feeder *n* (1928) **:** an animal that obtains its food by filtering organic matter or minute organisms from a current of water that passes through some part of its system

filter paper *n* (ca. 1846) **:** porous unsized paper used esp. for filtering

filter tip *n* (1932) **:** a cigar or cigarette tip designed to filter the smoke before it enters the smoker's mouth; *also* **:** a cigar or cigarette provided with such a tip — **fil·ter–tipped** \,fil-tər-'tipt\ *adj*

filth \'filth\ *n* [ME, fr. OE *fȳlth*, fr. *fūl* foul] (bef. 12c) **1 :** foul or putrid matter; *esp* **:** loathsome dirt or refuse **2 a :** moral corruption or defilement **b :** something that tends to corrupt or defile

filthy \'fil-thē\ *adj* **filth·i·er; -est** (14c) **1 :** covered with or containing filth **:** offensively dirty **2 a :** UNDERHAND, VILE **b :** OBSCENE *syn* see DIRTY — **filth·i·ly** \-thə-lē\ *adv* — **filth·i·ness** \-thē-nəs\ *n*

fil·trate \'fil-,trāt\ *n* (1845) **:** material that has passed through a filter

fil·tra·tion \fil-'trā-shən\ *n* (1605) **1 :** the process of filtering **2 :** the process of passing through or as if through a filter; *also* **:** DIFFUSION

fi·lum \'fī-ləm\ *n, pl* **fi·la** \-lə\ [NL, fr. L — more at FILE] (ca. 1860) **:** a filamentous structure **:** FILAMENT

fim·bria \'fim-brē-ə\ *n, pl* **-bri·ae** \-brē-,ē, -,ī\ [NL, fr. L, fringe] (ca. 1737) **:** a bordering fringe esp. at the entrance of the fallopian tubes — **fim·bri·al** \-brē-əl\ *adj*

fim·bri·at·ed \'fim-brē-,āt-əd\ *also* **fim·bri·ate** \-,āt\ *adj* (15c) **:** having the edge or extremity bordered by slender processes **:** FRINGED — **fim·bri·a·tion** \,fim-brē-'ā-shən\ *n*

¹fin \'fin\ *n* [ME *finn*, fr. OE; akin to L *spina* thorn, spine] (bef. 12c) **1 :** an external membranous process of an aquatic animal (as a fish) used in propelling or guiding the body — see FISH illustration **2 :** something resembling a fin esp. in appearance or function: **a :** HAND, ARM **b (1) :** an appendage of a boat (as a submarine) **(2) :** an airfoil attached to an airplane for directional stability **c :** FLIPPER 1b **d :** any of the projecting ribs on a radiator or an engine cylinder — **fin·like** \-,līk\ *adj* — **finned** \'find\ *adj*

²fin *vb* **finned; fin·ning** *vt* (1933) **:** to equip with fins ~ *vi* **:** to show the fins above the water

³fin *n* [Yiddish *finf* five, fr. OHG — more at FIVE] *slang* (1925) **:** a 5-dollar bill

fi·na·gle \fə-'nā-gəl\ *vb* **fi·na·gled; fi·na·gling** \-g(ə-)liŋ\ [perh. alter. of *fainaigue* (to renege)] *vt* (ca. 1924) **1 :** to obtain by indirect or involved means **2 :** to obtain by trickery **:** SWINDLE ~ *vi* **:** to use devious and often dishonest methods to achieve one's ends — **fi·na·gler** \-g(ə-)lər\ *n*

¹fi·nal \'fīn-ᵊl\ *adj* [ME, fr. MF, fr. L *finalis*, fr. *finis* boundary, end] (14c) **1 a :** not to be altered or undone ⟨all sales are ~⟩ **b :** of or relating to a concluding court action or proceeding ⟨~ decree⟩ **2 :** being the last in a series, process, or progress ⟨the ~ chapter⟩ **3 :** of or relating to the ultimate purpose or result of a process ⟨the ~ goal of life⟩ **4 :** relating to or occurring at the end or conclusion *syn* see LAST — **fi·nal·ly** \'fīn-ᵊl-ē, 'fīn-lē\ *adv*

²final *n* (1609) **:** something that is final: as **a :** a deciding match, game, heat, or trial — usu. used in pl. **b :** the last examination in a course — often used in pl.

fi·na·le \fə-'nal-ē, fi-'näl-\ *n* [It, fr. *finale*, adj., final, fr. L *finalis*] (1783) **:** the close or termination of something: as **a :** the last section of an instrumental musical composition **b :** the closing part, scene, or number in a public performance **c :** the last and often climactic event or item in a sequence

fi·nal·ist \'fīn-ᵊl-əst\ *n* (1898) **:** a contestant in the finals of a competition

fi·nal·i·ty \fī-'nal-ət-ē, fə-\ *n, pl* **-ties** (1833) **1 a :** the character or condition of being final, settled, irrevocable, or complete **b :** the condition of being at an ultimate point esp. of development or authority **2 :** something final; *esp* **:** a fundamental fact, action, or belief

fi·nal·ize \'fīn-ᵊl-,īz\ *vt* **-ized; -iz·ing** (1922) **1 :** to put in final or finished form ⟨soon my conclusion will be *finalized* —D. D. Eisenhower⟩ **2 :** to give final approval to ⟨*finalizing* the papers prepared and presented by his staff —*Newsweek*⟩ — **fi·nal·iza·tion** \,fīn-ᵊl-ə-'zā-shən\ *n*

usage *Finalize* has been frequently castigated as an unnecessary neologism or as U.S. government gobbledygook. It appears to have originated in Australia (where it has been acceptable all along) in the early 1920s. The U.S. Navy picked it up in the late 20s, and from there it came into widespread use. It is a standard formation (see -IZE). Our current evidence indicates it is most frequently used in government, business dealings, and child adoption; it usu. is not found in belles-lettres.

¹fi·nance \fə-'nan(t)s, 'fī-, fī-'\ *n* [ME, payment, ransom, fr. MF, fr. *finer* to end, pay, fr. *fin* end — more at FINE] (1739) **1** *pl* **:** money or other liquid resources of a government, business, group, or individual **2 :** the system that includes the circulation of money, the granting of credit, the making of investments, and the provision of banking facilities **3 :** the science or study of the management of funds **4 :** the obtaining of funds or capital **:** FINANCING

²finance *vt* **fi·nanced; fi·nanc·ing** (1866) **1 a :** to raise or provide funds or capital for ⟨~ a new house⟩ **b :** to furnish with necessary funds ⟨~ a son through college⟩ **2 :** to sell something to on credit

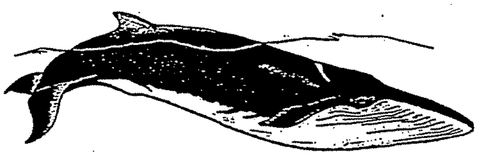
finance company *n* (1924) **:** a company that makes usu. small short-term loans usu. to individuals

fi·nan·cial \fə-'nan-chəl, fī-\ *adj* (1769) **:** relating to finance or financiers — **fi·nan·cial·ly** \-'nanch-(ə-)lē\ *adv*

fi·nan·cier \,fin-ən-'si(ə)r; fə-,nan-, ,fī-\ *n* (1618) **1 :** one who specializes in raising and expending public moneys **2 :** one who deals with finance and investment on a large scale

fi·nanc·ing *n* (1827) **:** the act or process or an instance of raising or providing funds; *also* **:** the funds thus raised or provided

fin·back \'fin-,bak\ *n* (1725) **:** a common whalebone whale (*Balaenoptera physalus*) of the Atlantic coast of the U.S. that attains a length of over 60 feet; *broadly* **:** RORQUAL



finback

finch \'finch\ *n* [ME, fr. OE *finc*; akin to OHG *fincho* finch, Gk *spiza* chaffinch] (bef. 12c) **:** any of numerous songbirds (as the sparrows, grosbeaks, crossbills, goldfinches, linnets, and buntings of the family Fringillidae) having a short stout conical bill adapted for crushing seeds

¹find \'fīnd\ *vb* **found** \'faund\; **find·ing** [ME *finden*, fr. OE *findan*; akin to OHG *findan* to find, L *pont-, pons* bridge, Gk *pontos* sea, Skt *patha* way, course] *vt* (bef. 12c) **1 a :** to come upon often accidentally **:** ENCOUNTER **b :** to meet with (a particular reception) ⟨hoped to ~ favor⟩ **2 a :** to come upon by searching or effort ⟨must ~ a suitable person for the job⟩ **b :** to discover by study or experiment ⟨~ an answer⟩ **c :** to obtain by effort or management ⟨~ the time to study⟩ **d :** ATTAIN, REACH ⟨the bullet *found* its mark⟩ **e :** to discover by

EXHIBIT 18

ENCYCLOPEDIA OF POLYMER SCIENCE AND ENGINEERING

VOLUME 7

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to
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FILMS

The use of plastic films is a recent development in the packaging industry, where the term plastic is broadly applied to the capability of being formed. Plastics are synthetic materials which can be shaped by heat or pressure in their manufacture.

Films are planar forms of plastic, thick enough to be self-supporting but thin enough to be flexed, folded, or creased without cracking. Reduction in the thickness reduces costs and increases the area obtained from a given weight of polymer (yield, m^2/kg). Film thickness depends on applications and manufacturing methods. It ranges from about 8 μm of solvent-cast polycarbonate for a capacitor film to a maximum thickness of 250 μm; in most applications it is below 125 μm. Heavier-gauge materials for glazing, blister packaging, and similar applications are usually referred to as sheets (see also SHEETING).

The use of plastic films has shown phenomenal growth during the past three decades. Numerous technical breakthroughs in polymerization and processing techniques resulted in compositions and properties designed for flexible and rigid packaging, industrial applications, and other uses. In addition, manufacturing costs were greatly reduced.

In 1984, U.S. consumption of plastic films was about 2.95×10^6 metric tons valued at >$\$6.3 \times 10^9$ (1–4). Commodity products, low density polyethylene (LDPE), and poly(vinyl chloride) (PVC) accounted for about 2.15×10^6 t; the rest are specialty films. High density polyethylene (HDPE), cast or blown, developed in 1979 for flexible packaging, is less expensive.

Specialties include the higher priced, high performance films of coated, coextruded, and laminated oriented polyester (OPET), oriented polypropylene (OPP), cellophane, oriented nylon (ON), oriented polystyrene (OPS), and vinylidene chloride copolymers (PVDC). In addition, specially designed films for high temper-

EXHIBIT 19

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MARILYN BAKKER, Editor-in-chief

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packages, made from specially compounded PVC suitable for gamma-ray sterilization, are increasingly popular. Since these medical supplies are generally not ingested, the PVC does not necessarily have to be an FDA grade. These general-purpose thermoforming grades of PVC are also used in the other market areas cited in Table 3. Particularly noteworthy are the rapid growth rates and high volumes in floppy disk jackets and cassette trays. Rigid PVC dominates each of these areas. In addition, its excellent sparkle, clarity, and printability makes it an excellent choice for clear box lids and now, with the "soft-crease" process, for folding or setup boxes.

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FILMS, PLASTIC

It is difficult to give a completely satisfactory definition of the difference between film and sheet. At one time anything up to 250 μm (10 mil) was generally recognized by the plastics industry as film (1). Anomalies arise when considering materials like unplasticized PVC or polystyrene, which are appreciably rigid at thicknesses of 150–200 μm (6–8 mil) (1). Recent technical developments have enabled satisfactory performance to be achieved with reduced thicknesses of plastic films and the upper figure of 250 μm now appears to be an academic one. Other proposed upper limits have included 75–150 μm (3–6 mil) depending on the stiffness of the plastic itself (2).

The range of materials now utilized as film formers is extremely large and cannot be covered fully in this article. The most important films are dealt with in other, more specific, articles in this encyclopedia. Other, more expensive high-performance materials are mentioned in the articles on coextrusions. In general, the usage of plastic films can be divided into single and composite films. The latter may be formed by coating a basic film (see Coating equipment), by lamination (bonding of two or more films with an adhesive or by heating) (see Laminating), and by coextrusion (3) (see Coextrusion, flat; Coextrusion, tubular; Coextrusions for flexible packaging; Coextrusions for semirigid packaging).

Packaging Films

Until about 1950 there were no large-tonnage thermoplastic packaging films. In the first half of the century, the dominant transparent packaging film was nonthermoplastic-regenerated cellulose (see Cellophane). In 1950, satisfactory low density polyethylene (LDPE) films were extruded for the first time (see Polyethylene, low density). A brief overview of the strengths and weaknesses of these two important, but very different, films is useful as a background to the developments that have taken place since midcentury.

Cellulose is a long-chain carbohydrate with no cross-linking. It is not thermoplastic, however, because the presence of a large number of hydroxyl groups in each molecule results in a high degree of hydrogen bonding and a consequent strong attraction between the chains (see Polymer properties). Exposure to heat does not soften the material. Charring occurs before the hydrogen bonding is overcome sufficiently to allow the chains to move. This means that cellophane (now a generic term except in the United Kingdom) cannot be heat sealed (see Sealing, heat), without a heat-seal coating. At first, cellophane was used only for decorative purposes. Its use in protective packaging was limited until the development of heat-seal coatings and moisture-proof coatings to improve its barrier properties. Cellophane is as clear as glass, has high tensile and bursting strength, and is a good barrier to oils, greases, and odors. The dry film is almost impermeable to gases but water-vapor permeability is high, and the gas permeability increases with moisture content.

LDPE does not have the tensile strength and stiffness of cellophane, but its flexibility and toughness permitted its use in applications where cellophane was useless (eg, heavy duty shipping bags) (see Bags, heavy-duty plastic). Also, its heat sealability opened up many other bag-packaging applications, including fresh produce, hardware items, toys, and many others (see Bags, plastic). Cellophane and LDPE can no longer be considered as competitors because of the many other films available, but they did compete years ago and much development was necessary before the limp LDPE film could be handled on high speed packaging machinery.

A more challenging competitor to cellophane was polypropylene. The nonoriented film entered the market in 1959 (see Film, nonoriented polypropylene). Polyethylene and polypropylene (PP) are both polyolefins, and both present profiles quite different from cellophane. However, PP differed in a few useful ways from LDPE because it had better transparency and gloss, twice the tensile strength, and higher heat resistance. Over the years, nonoriented PP has been used as an alternative to LDPE because of improved appearance (eg, in textiles packaging), and higher heat resistance (eg, in retortable pouches) (see Retortable flexible and semirigid packages). To put these three films in perspective, annual usage of LDPE film for packaging purposes in the United States is $2–3 \times 10^9$ lb/yr ($0.9–1.4 \times 10^6$ t/yr). The use of cellophane peaked at $200–300 \times 10^6$ lb/yr ($91–136 \times 10^3$ t/yr). Because nonoriented PP is more expensive than LDPE, so that its property profile is warranted in selected applications only, its use has not exceeded 100×10^6 lb/yr (45,000 t/yr). Biaxial orientation of

EXHIBIT 20

EXHIBIT 20

REDACTED IN ITS ENTIRETY

EXHIBIT 21

United States Patent [19] [11] **4,421,823**

Theisen et al. [45] **Dec. 20, 1983**

[54] **FLEXIBLE WRAPPING MATERIAL AND METHOD OF MANUFACTURE**

[75] Inventors: **Henry J. Theisen**, New London; **Willard H. Gehrke**, Appleton, both of Wis.

[73] Assignee: **Curwood, Inc.**, New London, Wis.

[21] Appl. No.: **383,754**

[22] Filed: **Jun. 1, 1982**

[51] **Int. Cl.**³ **B32B 27/06**; B29C 19/00; B33B 27/08

[52] **U.S. Cl.** **428/349**; 156/244.11; 426/127; 428/483; 428/516; 428/518; 428/520; 428/522

[58] **Field of Search** 428/516, 518, 520, 522, 428/483, 349; 426/127; 156/244.11

[56] **References Cited**

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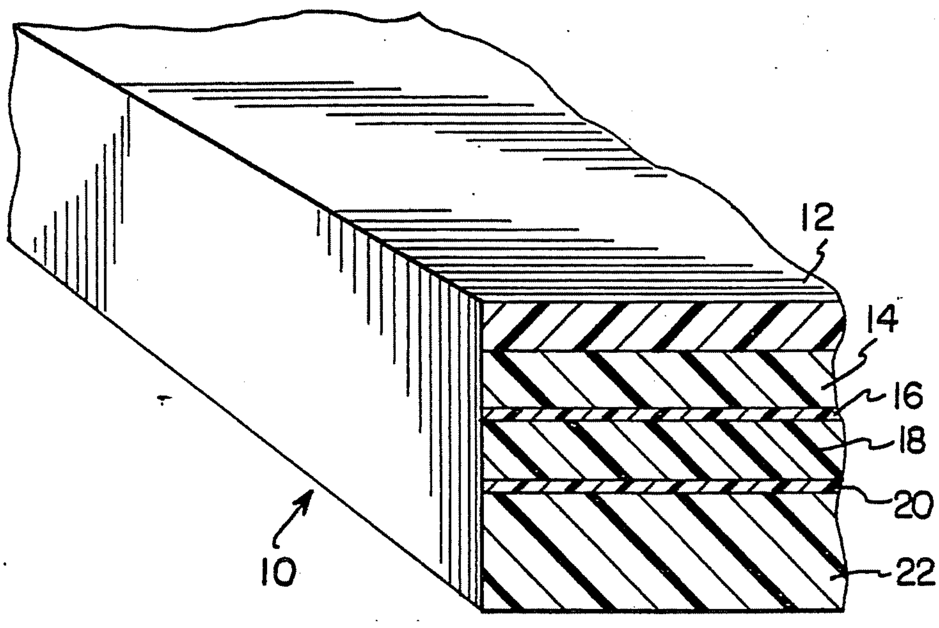
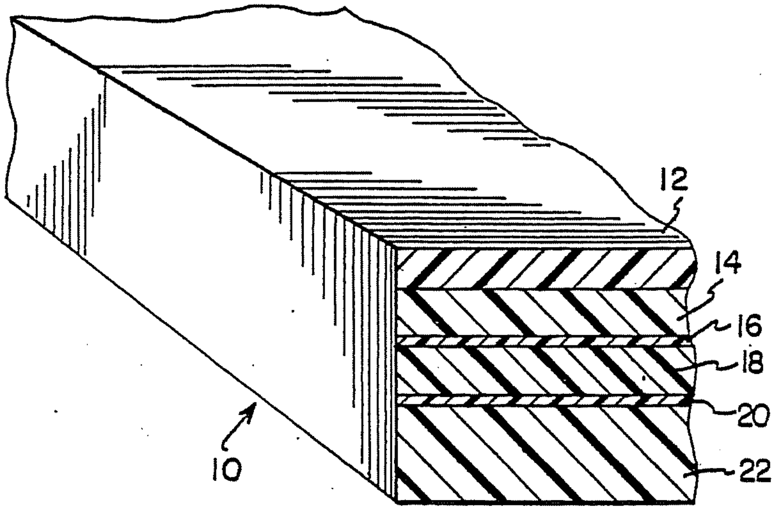
Primary Examiner—George F. Lesmes
Assistant Examiner—E. Rollins Buffalow
Attorney, Agent, or Firm—McWilliams, Mann, Zummer and Sweeney

[57] ABSTRACT

A flexible wrapping material comprising a film laminate is provided for packaging of food products which is resistant to flex-cracking and pinhole development, is impervious to liquids and gasses, and exhibits the property of grease-resistance without the use of adhesives to promote bonds between the layers. The film laminate consists of an outer layer of heat-set, biaxially oriented polymeric material followed by a layer of polymeric material, a layer of oxygen barrier polymer, a layer of biaxially oriented polypropylene, a special grease-resistant polymer, and an inner layer of heat-sealable polymeric material. The film laminate is made by bonding the outer surface layer of heat-set, biaxially oriented polymer to a substrate in which an oxygen barrier material is carried on a biaxially oriented polypropylene/special grease-resistant polymer by means of an intermediate layer of polymeric material. A layer of heat-sealable polymeric material is then extrusion-coated on the special polymer surface to form the inner layer of the laminate.

12 Claims, 1 Drawing Figure

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FLEXIBLE WRAPPING MATERIAL AND METHOD OF MANUFACTURE

BACKGROUND OF THE INVENTION

In the packaging of various food products, such as cheese and meat, in a flexible wrapper, difficulty has been experienced with the development of small pinholes in the wrapper at points of stress resulting from flexing of the wrapper during shipment and handling. The pinhole development resulted in a loss of the essential barrier characteristics of the wrapper and permitted loss or gain of moisture by the package and the access of oxygen into the package with resultant spoilage of the product intended to be protected by the wrapper.

A detailed discussion of the problems in this art and one film laminate which solved these problems is set forth in U.S. Pat. No. Re. 28,554, a reissue of U.S. Pat. No. 3,445,324. The teachings of that patent as to the state of the art are incorporated herein by reference. The wrapping material of the film laminate disclosed in U.S. Pat. No. Re. 28,554 consisted of a wrapping material prepared by bonding to one surface of a cellophane sheet coated on both sides with vinylidene chloride copolymer a biaxially oriented polypropylene sheet and to the other surface a thin layer of low density polyethylene or heat-sealable polymeric material having a melting point below that of the polypropylene. Bonding in that film laminate was accomplished by gluing or polyethylene lamination.

It was determined, however, that better results might be obtained if one were able to eliminate the adhesive layer which would also eliminate the use of any organic solvents that would be released into the atmosphere. The elimination of these solvents is a very important environmental consideration and reduces the threat of any residual organic material migrating into the food product being packaged. At the same time it was recognized that it was necessary to provide a film laminate which would maintain the integrity of the product and present a grease-resistant barrier to prevent the passing through of any food oils or grease which could destroy or greatly reduce the bond between the individual layers, thereby reducing the integrity of the package formed from upper and lower layers of the film laminate of the present invention.

U.S. Pat. No. Re. 28,554 discusses in detail the formation of packages of the type contemplated for use with the present film laminate. As indicated there, the wrapper or film laminate is contemplated for use on an automatic packaging machine which forms and closes the package by means of heat-sealing. The inner layer of heat-sealable polymeric material is placed in face-to-face relationship with the inner surface of a second laminate of identical construction which permits the formation of a heat-sealed closure which is gas-tight. With products such as cheese and meat it is found advantageous to displace the air from the void space inside the package by flushing with an inert gas or by evacuation before sealing the package. The retention of this gas or vacuum and the substantial exclusion of the atmospheric oxygen is important to the proper preservation of the product.

SUMMARY OF THE INVENTION

The present invention relates to a flexible wrapping material in laminate form and its method of manufacture. The laminate is particularly suited for packaging of food products such as cheese or meat. The laminate consists of an outer layer of heat-set, biaxially oriented polymeric material, such as polypropylene or polyester, bonded on its inner side to a layer of polymeric material, for example, polyethylene, which is sandwiched between the outer layer and a layer of oxygen barrier polymer, such as polyvinylidene chloride copolymer (Saran) or ethylenevinyl alcohol, a layer of biaxially oriented polypropylene, a layer of special grease-resistant polymer resistant to the migration of food oils or greases through the laminate selected from the group consisting of polyethylene, copolymers of vinyl acetate with a vinyl acetate content of approximately 12 percent or less, copoylmers of ethylene acrylic acid, an ethylene-vinyl acetate terpolymer, and ionomers, and an inner layer of heat-sealable polymeric material having a lower melting point than said outer layer, such as a vinyl acetate copolymer of polyethylene.

The laminate material is prepared in a two-part operation. An outer surface layer of biaxially oriented polymer is extrusion-laminated with an intermediate layer of polymeric material to a sustrate in which an oxygen barrier material is carried on a biaxially oriented polypropylene/special polymer. A layer of heat-sealable polymeric material is then extrusion-coated onto the special polymer surface of the material obtained in the first operation. In its preferred embodiment, the laminate produced does not require the use of adhesive and the solvents necessary with such use. This material offers a high degree of resistance to grease which can reduce the integrity of the packaging material by destroying or reducing the bond between individual laminate layers.

BRIEF DESCRIPTION OF THE DRAWING

The drawing shows an enlarged cross-sectional view showing a preferred form of the laminate of this invention.

DETAILED DESCRIPTION

Referring to the drawing, the numeral **10** indicates a film laminate made in accordance with the present invention. An outer layer **12** is supplied consisting of a balanced, heat-set, biaxially oriented polymeric material. Heat-set polypropylene or polyester have both been used and determined to be acceptable in forming the laminate of this invention. Heat-set is the property of dimensional stability or lack of shrink when exposed to sealing temperatures and is critical in the present environment. This layer, which becomes the outside of the package which is eventually formed, must be a tough, flexible film which can impart resistance to surface abrasions and prevent sticking of the film wrapper to the heat-seal bars on the packaging machine. This layer is generally a thin layer of from 0.4 to about 1.0 mils, preferably 0.4 to 0.75 mils. The degree of balance due to the biaxial orientation which is the resistance to unequal shrink or stretch in both the transverse and machine directions is not critical. Films of varying balance and heat-set function satisfactorily in the finished structure. Generally, biaxially oriented heat-set polypropylene or polyester is preferred.

Layer **14** consists of polymeric material which imparts a minimum degree of bonding between the biaxially oriented polymer **12** and the next layer **16**. Layer **14** is generally a thin layer of from about 0.4 to 1.0 mils of polyethylene, preferably 0.5 to 0.75 mils, having a den-

sity from about 0.910 to 0.930 grams per cubic centimeter and with a minimum melt temperature of 285° C. The thickness of this layer can vary with economics and application.

Layer **16** consists of an oxygen barrier polymer which has a polar functional group or groups to facilitate intermolecular attractive bonding such as polyvinylidene chloride (Saran) or ethylene-vinyl alcohol. This layer provides a barrier against the migration of oxygen through the laminate and is essential to protect the food being packaged against spoilage. Layer **16** provides the essential barrier properties necessary for extended shelf life. Layer **16** has a thickness of approximately 0.1 mil, however, due to the difficulty in measuring this thickness, it is generally expressed in pounds per 3,000 square feet, namely, 2.5 to 5.0 pounds per 3,000 square feet, preferably 3.0 to 4.0 pounds per 3,000 square feet.

Layer **18** consists of biaxially oriented polypropylene. This layer is a substitute for the cellophane layer disclosed in U.S. Pat. No. Re. 28,554 and provides greater resistance to pinholing due to abrasion or flexing. This layer imparts improved pinholing resistance to the final structure and generally varies in thickness from 0.5 to 1.5 mils depending upon the economics and application, preferably 0.6 to 0.8 mils.

Layer **20** comprises what will be referred to as a special grease-resistant polymer. The purpose of this layer is to prevent the migration of food oils through the polymeric heat-sealable material which could lead to a reduction or even loss of bonding between the individual layers of the flexible wrapping material. The loss of bond between the layers can lead to a loss of essential barrier properties due to the migration of oxygen or water vapor between the individual layers. Consequently, transfer of oxygen through the more permeable polymeric heat-sealable material and contact with the food product can result in loss of shelf life and possible food spoilage. This also results in a loss of package integrity due to bond reduction or loss of bond and also a reduction in heat-seal strength of the package due to layer separation.

The special grease-resistant polymer is a thin self-supporting layer of film at room temperature, generally having a minimum thickness of 0.1 mils, but preferably being 0.2 mils. The preferred method does not include the application and drying of a coating containing organic solvents which are detrimental to the environment. This special polymer consists of either polyethylene, copolymers of vinyl acetate having a vinyl acetate content of less than about 12 percent, ethylene acrylic acid copolymers, ethylene-vinyl acetate terpolymers, or ionomers. These special polymers also exhibit high grease-resistance properties and bonding abilities in various blends with each other. It has been found that copolymers of vinyl acetate having a vinyl acetate content in excess of 15 percent do not exhibit sufficient grease-resistant properties to perform in the intended environment.

The inner layer **22** is a heat-sealable polymeric material which provides excellent heat-sealability at temperatures less than 300° F. While polyethylene is suitable for this purpose, other low temperature, heat-sealable polymeric materials, such as ethylene-vinyl acetate copolymer, are preferred and ethylene-vinyl acetate copolymer blended with microcrystalline wax and paraffin wax in suitable proportions, may be used. It is important that the polymeric layer **22** have a lower melting

point than outer layer **12**. It is generally expected that the polymeric material of layer **22** will seal at a temperature below 270° F. on the packaging machinery. Due to the dimensions of the product being packaged, it is very difficult to bring the end portions of the flexible wrapper together in such a means as to prevent any wrinkling or creases in the heat-sealed areas of the film. Because of this, the polymer material must flow at the sealing temperature to "fill in." Thus, in the heat-seal process, it must flow and fill channels to yield an air-tight package. Layer **22** is generally from about 1.0 to about 3.0 mils thick and preferably from 1.5 mils to 2.5 mils.

It must be understood that certain variations in the physical properties of the materials of this film laminate can be made without departing from the scope of the present invention. Accordingly, Table 1 discloses the listed physical properties of each of the materials of the film laminate of the present invention.

TABLE I

Material	Softening Point °C.	Operating Range °C.	Melt Index 8M/10 min.	Density gm/cm^3
heat-set biaxially oriented polymer				
polypropylene	90–100	N.A.*	N.A.	0.905
polyester	250–260	N.A.	N.A.	1.38–1.41
nylon	215–225	N.A.	N.A.	1.1–1.3
polymeric material	90–100	300–350	2.0–10.	0.910–.950
oxygen barrier material	140–160	N.A.	N.A.	1.21–1.71
biaxially oriented polypropylene	90–100	N.A.	N.A.	0.905
special polymer				
polyethylene	90–100	150–360	.5–3.5	.91–.93
vinyl acetate copolymers	85–95	150–350	.25–30	.93–.95
copolymers of ethylene acrylic acid	80–90	140–340	5.5–11.	.925–.935
ethylene vinyl acetate terpolymers	35–82	200–325	3.5–35	.93–1.0
ionomers	85–100	165–360	.7–14	.94–.95
heat sealable polymeric material	60–70	200–220	7–31	.91–.95

*(NOTE - N.A. means not applicable)

The method of manufacture of the film laminate previously discussed is basically a two-part operation, each of the two steps being interchangeable. In the first operation of the preferred method, the heat-set, biaxially oriented polymer is extrusion-laminated to a biaxially oriented coextrustion of oxygen barrier coated polypropylene/special polymer. This requires corona treatment of the biaxially oriented polypropylene surface to a minimum treatment level of 35 dynes per square centimeter (ASTM Test Method D-2578) to facilitate good interfacial wetting of the oriented polypropylene surface to accept the emulsion-coating of the oxygen barrier material. This substrate, carrying an oxygen barrier material on biaxially oriented polypropylene/special polymer, is then extrusion-laminated to the corona treated surface of the outer layer of biaxially oriented polymer with a polymeric material in its molten state.

Other alternative methods are available to formulate the film laminate of the first step. One method consists of adhesive lamination of the outer layer of biaxially oriented polymer to the oxygen barrier material carried by the biaxially oriented polypropylene/special poly-

mer. Another alternative is to apply the oxygen barrier material in an out-of-line operation which would require a third operation. The preferred embodiment, however, is to use a coextrusion of biaxially oriented polypropylene/special polymer. Other methods are available to combine the biaxially oriented polypropylene and special polymer including extrusion-coating the special polymer onto the biaxially oriented polypropylene with or without the use of adhesives or primers. Alternately, solvent or emulsion-coating of the special polymer can be made onto the biaxially oriented polypropylene surface.

The second operation requires the extrusion-coating of the heat-sealable polymeric material onto the special polymer surface of the material obtained in the first operation. This can also be accomplished by adhesive lamination of the heat-sealable polymeric material to the special polymer surface of the material produced in the first operation.

Certain preferred embodiments of this invention and methods of making the laminate are illustrated in the following specific examples:

No. 1. A 45-gauge film of Curwood's CURPHANE brand 4640, a heat-set, biaxially oriented polypropylene manufactured from Hercules Resin PD-064, was extrusion-laminated to the polypropylene side of CURPHANE brand SCC 701 film, a biaxially oriented polypropylene/1650 DuPont Surlyn coextruded film; with 7 pounds per 3,000 square feet of polyethylene U.S.I. Grade 201 resin having a density of 0.916 and a melt index of 5.0. The CURPHANE SCC 701 film was corona treated and coated on the polypropylene side with 3.5 pounds (dry solids per 3,000 square feet) of Morton Surfene 2010, polyvinylidene chloride emulsion just prior to the extrusion-lamination. This lamination was then extrusion-coated on the Surlyn side of the CURPHANE SCC 701 with 28 pounds per 3,000 square feet of U.S.I. Grade 652–53, an 18 percent ethylene-vinyl acetate copolymer.

No. 2. A 50-gauge film of a heat-set, biaxially oriented polyester, manufactured from Eastman Plastic's resin 9663, was extrusion-laminated to the polypropylene side of CURPHANE brand SSC 701, a biaxially oriented polypropylene/1650 DuPont Surlyn coextruded film; with 7 pounds per 3,000 square feet of polyethylene, U.S.I. Grade 201 resin having a density of 0.916 and a melt index of 5.0. The CURPHANE brand SSC 701 film was corona treated and coated on the polypropylene side with 3.5 pounds (dry solids per 3,000 square feet) of Morton Surfene 2010, polyvinylidene chloride emulsion just prior to the extrusion-lamination. This lamination was then extrusion-coated on the Surlyn side of the CURPHANE brand SCC 701 with 28 pounds per 3,000 square feet of U.S.I. Grade 652–53 an 18 percent ethylene-vinyl acetate copolymer.

No. 3. A 45-gauge film of Curwood's CURPHANE brand 4640, a heat-set, biaxially oriented polypropylene manufactured from Hercules Resin PD-064, was extrusion-laminated to the polypropylene side of Norprop 380CG, a biaxially oriented polypropylene/ethylene-vinyl acetate coextruded film, with 7 pounds per 3,000 square feet of polyethylene, U.S.I. Grade 201 resin having a density of 0.916 and a melt index of 5.0. The Norprop 380CG film was corona treated and coated on the polypropylene side with 3.5 pounds (dry solids per 3,000 square feet) of Morton Surfene 2010, polyvinylidene chloride emulsion just prior to the extrusion-lamination. This lamination was then extrusion-coated on the vinyl acetate side of the Norprop 380CG with 28 pounds per 3,000 square feet of U.S.I. Grade 652–53, and 18 percent ethylene-vinyl acetate copolymer.

Tests have been conducted along the lines set forth in Columns 6 and 7 of U.S. Pat. No. Re. 28,554 to determine the relative effectiveness of packages made in accordance with the flexible film laminate of the present invention. These tests have indicated a surprising superiority of this new wrapping material over the wrapping material of U.S. Pat. No. Re. 28,554 and other flexible film laminates tested.

Thus, it has been shown, somewhat surprisingly, that the cellophane layer, Saran coated on both sides, of the film laminate disclosed in U.S. Pat. No. Re. 28,554 can be eliminated and be replaced by a biaxially oriented polypropylene coated on its upper side with Saran and bonded on its lower side to a special grease-resistant polymer and that the film laminate can be constructed without the use of adhesives or organic solvents that would be released into the atmosphere.

The resultant film laminate is superior in its resistance to pinhole development due to abrasion or flexing. The laminate is also superior in terms of its oxygen barrier properties and internal bond strength resulting in a package of greater integrity preventing food spoilage and resulting in extended shelf life.

Various features of the invention have been particularly shown and described in connection with the illustrated embodiments of the invention. However, it must be understood that these particular arrangements merely illustrate and that the invention is to be given its fullest interpretation within the terms of the appended claims.

What is claimed is:

1. A film laminate of flexible, heat-sealable wrapping material, particularly suitable for use in the packaging of products which are to be maintained in hermetically sealed relationship to the atmosphere, comprising a first outer layer of heat-set, biaxially oriented polymeric material bonded on its inner side to a layer of polymeric material which is sandwiched between said outer layer and a layer of oxygen barrier polymer, adapted to provide a barrier against the migration of oxygen through the laminate, a layer of biaxially oriented polypropylene disposed between said layer of oxygen barrier polymer and a layer of special grease-resistant polymer bonding, without the use of a solvent, said layer of biaxially oriented polypropylene to an inner layer of heat-sealable polymeric material having a lower melting point than said outer layer whereby said layer of special grease-resistant polymer is resistant to food oils and greases and is selected from the group consisting of polyethylene, copolymers of vinyl acetate having a vinyl acetate content of approximately 12 percent or less, copolymers of ethylene acrylic acid, ethylene-vinyl acetate terpolymers, and ionomers.

2. A film laminate in accordance with claim 1 wherein said outer layer is heat-set, biaxially oriented polypropylene.

3. A film laminate in accordance with claim 1 wherein said outer layer is heat-set, biaxially oriented polyester.

4. A film laminate in accordance with claim 1 wherein said layer of polymeric material sandwiches between said outer layer and said oxygen barrier layer is polyethylene.

5. A flim laminate in accordance with claim 1 wherein said oxygen barrier layer is polyvinylidene chloride.

6. A film laminate in accordance with claim 1 wherein said oxygen barrier layer is ethylene-vinyl alcohol.

7. A film laminate in accordance with claim 1 wherein said layer of special grease-resistant polymer is polyethylene.

8. A film laminate in accordance with claim 1 wherein said layer of special grease-resistant polymer is a copolymer of vinyl acetate having a vinyl acetate content of approximately 12 percent or less.

9. A film laminate in accordance with claim 1 wherein said layer of special grease-resistant polymer is a copolymer of ethylene acrylic acid.

10. A film laminate in accordance with claim 1 wherein said layer of special grease-resistant polymer is an ethylene-vinyl acetate terpolymer.

11. A film laminate in accordance with claim 1 wherein said layer of special grease-resistant polymer is an ionomer.

12. A method of making a film laminate of flexible, heat-sealable wrapping material, suitable for use in the packaging of products which are to be maintained in hermetically sealed relationship to the atmosphere, the steps of the method comprising forming a substrate of oxygen barrier material/biaxially oriented polypropylene/special grease-resistant polymer by emulsion-coating of the oxygen barrier material onto a coextrusion of biaxially oriented polypropylene and special grease-resistant polymer, extrusion laminating an outer layer of heat-set, biaxially oriented polymeric material onto said oxygen barrier surface of said substrate with a layer of polymeric material in its molten state and extrusion coating, as an inner layer, a heat-sealable polymeric material onto said special grease resistant polymeric surface of said substrate.

* * * * *

EXHIBIT 22

7

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

CRYOVAC, INC.,	)	
	)	
Plaintiff/Counter-Defendant.	)	Civil Action No. 04-1278
	)	
vs.	)	Hon. Kent A. Jordan
	)	
PECHINEY PLASTIC PACKAGING, INC.,	)	
	)	
	)	
Defendant/Counter-Plaintiff.	)	

EXPERT REPORT OF ELDRIDGE M. MOUNT III

Dated: May 19, 2005

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EXPERT REPORT OF ELDRIDGE M. MOUNT III

Summary

I Eldridge M. Mount III have prepared this report in relationship to the investigation relating to:

Cryovac, Inc. v. Pechiney Plastic Packaging, Inc.; Civil Action No. 04-1278
In The United States District Court for The District Of Delaware
Hon. Kent A Jordan

Introduction

The opinions expressed in this report are my own and I have personal knowledge of the facts recited.

If called as a witness I could testify competently to the facts and opinions herein.

Qualifications

See attached C.V. as Exhibit 1.

Other Cases As Expert

See attached C.V. as Exhibit 1.

Compensation statement

As a technical expert in this case my fees are $175.00/hour for technical work and opinions and $250.00/hour for sworn testimony. In addition my expenses for testing and travel are reimbursed at cost. My compensation is not affected by the outcome of this case and is based solely on the time spent in the development of my opinion.

Scope of Expert Report

Pechiney Plastic Packaging, Inc., through their counsel has asked me to review documents and testimony related to this case and to render an opinion whether or not certain prior art documents disclose all of the elements of claim 11 of the '419 patent or if the subject matter of claim 11 ~~would have been obvious to one of ordinary skill in the art. I have also been asked to provide~~ my opinion on whether or not certain claim terms are definite or adequately described in the '419 patent if those claim terms mean what I understand Cryovac says they mean.

Publications

Over the last 33 years I have authored the publications which are attached in my resume as Exhibit 1.

Information reviewed

Since my retention as an expert in this case for the purpose of the preparation of my opinion, I have examined and reviewed the documents listed in this report and Exhibit 2.

Exhibits For Summary Or Support

I have not yet prepared any exhibits to be used as a summary of or support for my opinions. I reserve the right to do so in the future in accordance with the schedule set by the Court and/or agreed to by Pechiney and Cryovac for such exhibits. I may use any of the documents that I have reviewed in connection with this report as exhibits that support my opinions.

Summary of Opinions

It is my opinion that the prior art disclosures show one of ordinary skill in the art that all of the claim elements of claim 11 of the '419 patent are specifically disclosed or would have been obvious to one of ordinary skill in the art.

In particular,

1) It is my opinion that US Patent 4,746,562, the Fant film, US Patent 5,055,355, the Blackwell article, the Hessenbruch article, and the Hatley film as described in the Hatley article and the Journal of Commerce article (as well as the Hatley article itself) each disclose all of the claim elements of claim 11 of the '419 patent, and therefore claim 11 of the '419 patent is anticipated by these disclosures.

2) The subject matter of claim 11 of the '419 patent as a whole would have been obvious to one of ordinary skill in the art because one of ordinary skill in the art would have had sufficient motivation to orient films disclosed in prior art references disclosing a coextruded film having seven layer arranged symmetrically such as polymeric material/adhesive polymer/polyamide/EVOH/polyamide/adhesive polymer/polymeric material, such as US Patent 4,746,562, the Journal of Commerce article, and the Hatley article if the Court or the jury determine that the films were not oriented. The motivation coming from the skill of one of ordinary skill in the art, the above references or the above references combined with the teachings of prior art references disclosing EVOH and nylon layers for example, US Patents 4,746,562, 5,055,355, 4,511,610, 4,572,854, 4,640,852, Japanese Utility Patent 60-27000, European Patent Application 0063006A1, and the Blackwell article.

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3) The subject matter of claim 11 of the '419 patent as a whole would have been obvious to one of ordinary skill in the art because one of ordinary skill in the art would have had sufficient motivation to use polyamide as intermediate layers in prior art references disclosing oriented polymeric material/adhesive polymers/intermediate layer/EVOH/intermediate layer/adhesive polymers/polymeric material such as US Patents 4,572,854 and 4,511,610. The motivation coming from the skill of one of ordinary skill in the art, the above references alone or in combination with prior art references such as European Patent Application 0063006A1, Japanese Utility Patent 60-27000, US Patents 4,746,562, 4,361,628, 4,608,286, the Hatley article, the Fant film, the Journal of Commerce article, the Hatley film, the Blackwell article and the Hessenbruch article that disclose the use of intermediately polyamide layers and the benefits they produce.

4) The subject matter of claim 11 of the '419 patent as a whole would have been obvious to one of ordinary skill in the art because one of ordinary skill in the art would have had sufficient motivation to add a polymeric material outer layer and an adhesive layer to prior art structures containing polyamide/EVOH/polyamide/adhesive polymer/polymeric material such as US Patent 4,640,852. The motivation coming from the need to produce a moisture resistant film for non-retort applications or from US Patent 4,746,562, the Fant film, the Journal of Commerce article, the Blackwell article, and the Hatley article.

Also it is my opinion that should the claim element "arranged symmetrically" be construed to require only similar materials in corresponding layers without regard to thickness, formulation and function, then the claim element "arranged symmetrically" of claim 11 is indefinite and the specification does not contain a written description of such a construction.

I may also testify about my opinion on general aspects of the technology at issue depending upon what, if any, such evidence is offered by witnesses for Cryovac.

Basis for opinions expressed

My opinions are based on my education and work experience as set forth above in Exhibit 1 detailing the description of my qualifications and in my Resume detailing the particulars of my past employment, and the review of the materials listed in this report and in Exhibit 2.

Ongoing nature of analysis

I am continuing my study and analysis of the information that I have considered in preparing this report. From time to time I may refine or expand on my opinions during the course of that further study. Also, I reserve the right to alter my opinions in the event that additional information is brought to my attention.

The Hypothetical Person Of Ordinary Skill In The Art

Throughout this report whenever I discuss or mention one of ordinary skill in the art, I am referring to a person with the level of skill as described on the filing date of the '419 patent, March 21, 1986, or thereabouts. Throughout this report whenever I mention about what was known or understood or what would have been known or understood or obvious to one of ordinary skill in the art, my opinions are based upon what was known or understood or would have been known or understood or obvious as of the filing date of the '419 patent, March 21, ~~1986, or thereabouts. (Although my opinion would not be significantly different if instead one~~ looked at a time around November 1984, when I understand Cryovac says that the subject matter of the '419 patent was conceived, or April 1985, when I understand Cryovac says that the subject matter of the '419 patent was actually reduced to practice, or July 5, 1988, when the '419 patent issued.

I have been told that "Cryovac's present statement is that a person of ordinary skill in the art that is the subject matter of the '419 patent would be someone with a Bachelor's degree in chemical engineering, chemistry, or a related science and at least two years of experience in packaging industry research and development, particularly with multilayer films." (Cryovac's Response to Pechiney's First Set of Interrogatories).

I have been asked to give my opinion as to who the person of ordinary skill in the art of the '419 patent represents as of the filing date of the '419 patent, March 21, 1986. It is my opinion that a person of ordinary skill in the art would be someone with a bachelor's degree in chemical engineering, chemistry, physics or related sciences with from 3 to 5 years experience in the design, manufacturing, end use application development and packaging machine performance making use of multilayer barrier packaging films. The relevant amount of experience can be moderated by an individual's particular level of education.

The subject matter to which the '419 patent is addressed is set forth in the patent, col. 1, lines 5-8, which reads as follows:

"This invention relates to oriented thermoplastic films for packaging applications, and more particularly relates to coextruded multilayer, oriented film having good strength and oxygen barrier characteristics."

From this statement a person of ordinary skill in the art would have understood that the films of interest are to contain oriented thermoplastic polymers, where the oriented polymer molecules are arranged in specific and distinct polymer layers formed by the coextrusion process and strongly adhered together into a composite structure for the combined purpose of improving the strength and oxygen barrier properties of the composite film structure.

An intended use for these oriented, thermoplastic, coextruded, multilayer films is described in the '419 patent, col. 1, lines 9-12 which reads as follows:

"Thermoplastic film, and especially polyolefin materials, have been used in the past to package various articles including perishable food products which require protection from the environment, resistance to physical and environmental abuse during storage and distribution, and an aesthetic and attractive appearance."

Therefore, a person of ordinary skill in the art would have understood that the films are intended for the packaging of objects which require acceptable film optical qualities, require acceptable package formation and package appearance, while insuring protection from the environment, and in particular packaging films which are tough and will resist physical abuse while maintaining an acceptable barrier (oxygen, moisture and flavor and aroma) properties for the purpose of maintaining or extending the shelf life of the product.

A person of ordinary skill in the art would have known that acceptable or Fit-For-Use (FFU) packaging materials must first and foremost be able to provide the protection required by the product, aid in presenting or displaying the product to the consumer while permitting the packaging operation to proceed smoothly and at high productivity. To this end packaging materials are designed by tailoring physical, thermal, barrier, surface and machining properties for the packaging application and product. For example, FFU packaging film designs are generally not made in the abstract but with particular end uses, packaging equipment and packaging product protection targets in mind.

In general food products are made sensitive to the ambient environment by processing the food into an intermediate or final form for later consumption. This processing will make them sensitive to a variety of environmental conditions and challenges. The type of environmental

protection necessary for perishable food products will vary somewhat from food type to food type but this is more in the degree or level of a specific protection needed rather than the number and types of protection needed. The general requirements of packaging films are fairly universal but will need specific refinement when designing a packaging material for a particular food and packaging method. Successful or Fit-For-Use packaging films must supply the appropriate level of protection for the product in its distribution cycle, and must also be transformable into a closed package on the packaging machine to be used for packaging the particular product. The person of ordinary skill in the art would have known how to determine the appropriate level of packaging protection necessary for various food products and the film structures (material selection and thicknesses) and film formulations necessary for successful conversion of the film into a package on the chosen packaging equipment. (US Patent 4,532,189, col. 2, lines 55-62)

I will now discuss a range of packaging related technologies, topics and subjects which I believe a person of ordinary skill in the art would have been aware of and known as of March 21, 1986.

Layer Combinations and Coextrusion

Many properties in packaging films are present due to the combination of polymers together such as by coating, lamination or coextrusion which results in stacks of various polymer layers. The reason it is necessary to layer polymers together to obtain a desired level of packaging performance or protection is that there is no "universal" polymer which by itself will permit the effective packaging of all food products. Consequently, it was well understood by those of ordinary skill in the art that polymer combinations were necessary to tailor packaging performance while optimizing the cost and performance ratio of the packaging material. It was also well understood that the method of producing the polymer combination would have affected its final property profile.

Coextrusion was also well known to those of ordinary skill in the art to be a process which minimized the cost of multiple layer polymer combinations (Hessenbruch, pp 88-89, Blackwell, p 213, Modern Plastics, p 40) because the coextruded layers could have been thinner than those typical of laminating films, thereby saving material and processing costs. Also, the polymer combinations were produced in a single operation rather than by combining materials produced in multiple operations further lowering the manufacturing cost by minimizing the equipment, material and labor costs associated with lamination processes.

Adhesion (between layers)

Adhesion of layers is the ability of two surfaces to remain in intimate contact when a force is applied to or across the interface. Adhesion forces had been studied for many years as of 1986 and it would have been understood by one of ordinary skill in the art that the adhesion developed between two polymer layers will depend upon the chemical compatibility of the two polymers or in some manner the polarity difference between the polymers much as with the solubility of small molecules, where it was well understood by one of ordinary skill in the art that "like dissolves like". For the purpose of this discussion, I have assumed that the subject matter of the '419 patent would require interfacial adhesion which produces no interlayer delamination (delamination might be desirable in some applications such as for a peelable seal or production